

# The Canadian Entomologist.

LXXIV

AUGUST, 1942

No. 8

## A NEW SPECIES OF TICK FOUND ON SHREWS\*

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### *Ixodes soriels* n. sp.

**FEMALE.** Dimensions of unengorged holotype—1.2 mm. (to tip of scapula) x .78 mm. Colour—pale, dirty white, engorged specimens pale and yellowish.

**Capitulum.** Length 340 microns (tip of hypostome to dorsal ridge); width (at cornua) 300 microns. Surface of basis capituli smooth and impunctate. Cornua heavily chitinized but not prominent. Porose areas oval, about 100 x 50; interval 40 microns. General colour of capitulum a pale brown, with exception of dark brown, heavily chitinized anterior shoulders which form an angle of about 70° with the longitudinal axis. Auriculae present as chitinized ridges. Hypostome, 200 microns long (tip to lateral junctions of basis capituli) and sharply pointed. Teeth, 3/3.

**Palpi.** Extend 15 microns beyond tip of hypostome. Articles 2 and 3 about equal in length; their total length 280 microns. Width, 100 microns.

**Scutum.** .75 mm. x .55 mm.; broadest about 2/5 its distance back from the anterior margin. Surface slightly rugose and pale in colour. Scapulae short and not heavily chitinized, their inner margins extending backwards about 70 microns. Cervical and lateral grooves not very prominent. Postscutal area covered sparsely with hairs. Distance from scutum to posterior border in unengorged tick, 400 microns.

**Legs.** Moderate in length and decidedly pale in colour. Tarsus I not noticeably humped. Tarsus I, 270 microns; metatarsus 140 microns.

**Coxae.** Coxa I bidentate; internal spur blunt and about as broad as long, external spur about same size and slightly broader than long. Suggestion of internal spur on coxa II, coxae III and IV with none. External spurs on coxae II, III, IV, about same size as that on coxa I.

**Spiracle.** Nearly circular, 150 microns across. Goblets in two rows. Macula anteriorly placed.

Genital and anal grooves rounded.

### **NYMPH.**

**Capitulum.** Length, 150 microns (tip of hypostome to dorsal ridge); width (at cornua) 170 microns. Postero-laterally projecting cornua. Combined length of palpal articles 2 and 3, 100 microns; width 50 microns. Ventrally, stout processes project postero-laterally and anteriorly from palpal article 1. Hypostome length 90 microns, files 2/2.

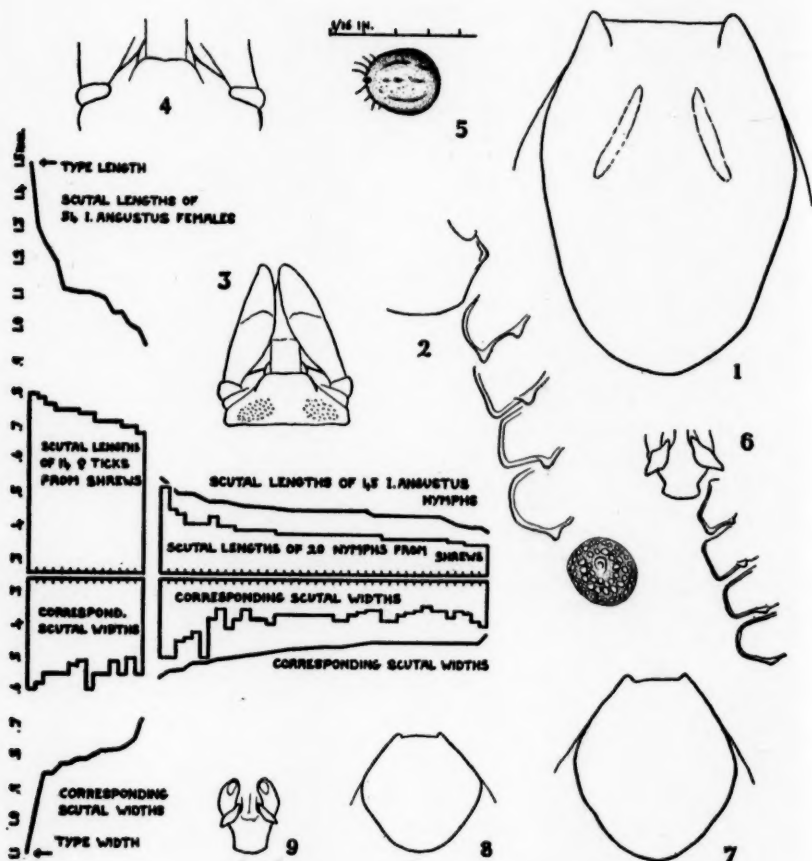
**Scutum.** Length 400 microns; width 357 microns; broadest slightly posterior to centre. Apex broadly rounded. Scapulae blunt. Surface slightly rugose.

**Coxae.** Spines as in female.

**Spiracle.** Ellipsoidal; 100 microns x 90 microns.

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## PLATE XI.



## IXODES SORICIS n. sp.

- Fig. 1. Scutum of *Ixodes soricis* n. sp.  
 Fig. 2. Coxae, auricula, and spiracle of *I. soricis*, ventral view.  
 Fig. 3. Capitulum of *I. soricis*, dorsal view.  
 Fig. 4. Capitulum of *I. angustus* Neumann, dorsal view, showing angle of anterior shoulders.  
 Fig. 5. Engorged *I. soricis*.  
 Fig. 6. Capitulum and coxae of *I. soricis* nymph, ventral view.  
 Fig. 7. Scutum of *I. soricis* nymph.  
 Fig. 8. Scutum of *I. soricis* larvae.  
 Fig. 9. Capitulum of *I. soricis* larvae, ventral view. Graph, illustrating relative scutal sizes of *I. angustus* and *I. soricis* females and nymphs.

**LARVA.**

**Capitulum.** Length, 120 microns; width 120 microns. Palpi, 80 microns x 35 microns, palpal article 1 with processes similar to those of nymph, though to a lesser degree. Hypostome 60 microns.

**Scutum.** Length 257 microns, width 280 microns.

**Coxae.** Small obtuse internal spur on coxa I. Other spurs insignificant.

General chitination of nymph and larva, pale and thin.

Holotype female, two nymphs and two larvae have been deposited in the Canadian National Collection at Ottawa under Type No. 5291. One female, two nymphs and two larvae have been forwarded to the U. S. National Museum, Washington, D. C.

Specimens of *I. soricis* examined were all from shrews (*Sorex* spp.) and were from the following localities: Comox, V. I., B. C., one female, 14-XII-39; Powell River, B. C., two females, 19-VIII-29; Alta Lake, B. C., one female, 9-VIII-32, two females, 30-VIII-41; West Vancouver, B. C., one female and two nymphs, 9-VII-36, two nymphs, 26-VII-34, two nymphs and two larvae, 8-VIII-34, three nymphs, 9-VII-36, two larvae, 9-VII-36; Point Grey, B. C., one female, 12-XI-38; Aldergrove, B. C., one female, 24-VIII-30; Harrison Bay, B. C., three females and one nymph, 3-IX-40; Silver Creek, Hope, B. C., two females and two nymphs, 15-IX-41, eight larvae, 22-IV-40, twenty-four nymphs and six larvae, 31-V-41.

Until a sufficiently large series of *I. soricis* had been accumulated, this tick was placed tentatively as an extremely small variety of *I. angustus* Neumann, 1899. Apart from its size, it resembles this species extraordinarily closely in all stages, with the exception that in the female of *I. soricis* the anterior shoulders of the capitulum appear to be less sloping than those of *I. angustus*. It is the marked host specificity and the uniform smallness of size that has led the author to finally separate the tick from the latter species. Of a series of over fifty *I. angustus* females examined, no specimen exhibited smaller scutal measurements than .95 mm. x .68 mm. The average dimensions of all these *angustus* ticks were about 1.1 mm. x .82 mm., and the maximum size was 1.4 mm. x .9 mm. The scutum of the female mentioned in Nuttall and Warburton's redescription of *I. angustus* is even larger, being 1.5 mm. x 1.1 mm. Fifteen specimens of female ticks from shrews, all *soricis*, with the exception of one large female that was taken at Sugar Lake, B. C., and which is believed to be *I. angustus*, exhibited constant scuta, varying only between .8 and .68 mm. x .6 and .5 mm. in size. Since the scutum does not change in size as the tick feeds, it cannot be said that the smallness of these ticks was due to undernourishment, the shrew being perhaps an unfavourable host. If the ticks were *angustus* and owed their small size to the fact that the nymphal stage had been starved, then small adults should also be found on neighboring squirrels. It would appear that all stages of *I. soricis* are specific to shrews, and that these animals are rarely parasitized by adult *angustus* ticks but are occasionally hosts to the nymphs and seeds of this tick. This is suggested by the presence of a few markedly larger and more heavily chitinated nymphs (undoubtedly those of *I. angustus*) mixed with the 40 nymphal ticks examined from shrews. In the case of the larval stages, there is a still more even proportion of the two species of ticks.

The 170 adult, nymphal and larval *I. angustus* examined were from squirrels, rabbits, moles, rats, mice, chipmunks, dogs and shrews. These specimens were taken at Malahat, Mt. Arrowsmith, Powell River, Vancouver, Cultus Lake, Harrison Bay, Hope, Birken, Tetana Lake, and Vavenby, B. C.

*CLISTOMORPHA*, *PSALIDOPTERYX* AND ALLIES (DIPTERA,  
TACHINIDAE) \*

BY A. R. BROOKS,  
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The genus *Clistomorpha*, as considered by Curran in 1927 (Can. Ent., LIX, 297), contains representatives of a number of distinct genera, namely *Clistomorpha* Townsend and *Hyalomyodes* Townsend of the Gymnosomatidae, as well as of *Psolidopteryx* Townsend and *Neopsolidopteryx* n. gen. of the Exoristidae. The males of these genera are much alike superficially, all being from 3 to 6 mm. long; gold and silvery pollinose; with globose abdomen; three or four lateral scutellar bristles; chaetotaxy well developed, and the apical cell (except in *Clistomorpha*) long petiolate. The females fall into two groups, the gymnosomatid genera having the front narrow and lacking orbital bristles, thereby closely resembling the males, and the exoristid genera having the front wide and orbital bristles present, not at all resembling the males in this character.

Material included in this study is from the U. S. National Museum, kindly sent to me by Mr. D. G. Hall, and from the Canadian National Collection. I wish to thank Mr. Hall for his generous aid in comparing descriptions with the types in his charge and for answering numerous questions.

The following key will separate the genera under consideration,

1. Frontal bristles ending at the anterior points of the frontalia; front narrow in both sexes, no orbital bristles present; three lateral scutellar bristles, the hind decussate, no apical scutellars; prosternum bare. Apical cell ending in wing margin or long petiolate ..... 2
  - Frontal bristles 1 or 2 in advance of frontalia points; female front wide, bearing 2 proclinate and 1 reclinate orbital; four lateral scutellars, the hind decussate, no apical scutellars; prosternum haired or bristled. Apical cell long petiolate ..... 3
    2. Apical cell ending in wing margin or extremely short petiolate ..... *Clistomorpha* Townsend
      - Apical cell long petiolate ..... *Hyalomyodes* Townsend
    3. Palpi equal or nearly equal to the haustellum in length, robust, sometimes greatly widened and clavate; oral margin axis shorter than antennal axis; epistoma short, not as long as wide; haustellum short and thick;  $M_3$  usually nearer to  $R_6$  ..... *Psolidopteryx* Townsend
      - Palpi only one-third of haustellum length, slender and cylindrical; oral margin axis equal to or longer than antennal axis; epistoma nearly as long as wide; haustellum long and slender, one-half head height in length;  $M_3$  midway ..... *Neopsolidopteryx* n. gen.

***Hyalomyodes* TT.**

1893, Townsend, Psyche, VI, 429. Type *Hyalomyodes weedii* TT. (equals *Hyalomya triangulifera* Lw.).

This genus, one of the Gymnosomatidae as defined by Townsend in his manual, was united with *Clistomorpha* TT. by Curran in 1927 and in 1934. It contains three species in Canada and United States with others from Mexico and South America, the species on the whole being very uniform and hard to distinguish. *H. robusta* TT. is strongly characterized, but is placed in this genus for reasons that appear in the discussion of that species.

The following key will separate the species of the United States and Canada.

1. Parafacials more than one-half clypeal width; epistoma broadly triangular and not warped forward, as long as clypeus. Third arisal segment

\*Contribution No. 2157, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

- abruptly enlarged at the base. First abdominal segment with pollen (Fig. 1) ..... *robusta* TT.  
 Parafacials less than two-fifths clypeal width; epistoma short and warped forward. Third arisal segment slightly enlarged at the base. First abdominal segment without pollen ..... 2  
 2. Parafacials one-fifth to one-quarter as wide as distance between vibrissae; cheek groove next vibrissae not distinct; pollen on abdomen silvery, faintly golden (Fig. 2) ..... *triangulifera* (Lw.)  
 Parafacials two-fifths as wide as distance between vibrissae; cheek groove next vibrissae distinct; pollen usually more golden ..... *californica* TT.

### *Hyalomyodes triangulifera* (Lw.)

- 1863, *Hyalomya triangulifera* Loew, Cent. Dipt., IV, 85; male from New York.  
 1893, *Hyalomyodes weedii* Townsend, Psyche, VI, 429; male and female from New Hampshire.  
 1905, *Hyalomyodes triangulifera* Lw. of Aldrich, Cat. 439.  
 1927, *Clistomorpha triangulifera* Lw. of Curran, Can. Ent., LIX, 297.

Coquillett's concept of this species involved the true *triangulifera* male linked with a *Psalidopteryx* female (his description of the female *triangulifera*, Proc. U. S. Nat. Mus., XXV, 109, refers probably to female *Psalidopteryx*), and likewise his *Hyalomyodes dorsalis* is a *Psalidopteryx*. The Aldrich catalogue follows the Coquillett concept.

*H. triangulifera* is a rather common species, usually mostly silvery pollinose, with traces of golden on the abdomen and thorax, becoming more golden in the western states. The parafacials and cheeks are nearly contiguous, thereby reducing the cheek groove to a minimum and causing the front to be uniformly arcuate and strongly sloped. I have seen specimens from the following states and provinces: Idaho, New Hampshire, New Mexico, Maine, Maryland, New York, Massachusetts, Ohio, Virginia, South Carolina, Wisconsin, Oregon, Washington, British Columbia, Ontario, Quebec, New Brunswick, Nova Scotia; none have been seen from the prairie provinces or states or from northern Canada. The dates of capture vary from June first to November eighth, being most numerous in the early part of July and the latter part of August.

### *Hyalomyodes californica* TT.

- 1908, *Hyalomyodes californica* Townsend, Smith. Misc. Coll., Vol. LI, 126; male and female, Santa Clara County, Cal.

The original description states that the humeri are more golden than in *triangulifera*. The specimens that I have seen can not be distinguished from *triangulifera* on this character, some being quite silvery, while the western *triangulifera* may be golden. The parafacials and cheeks in this species are not so close together, the cheek grooves being more pronounced. This enlarging of the cheek groove has shifted the antennal axis higher, and caused the face to become narrower. This species occurs in California, and two males in the Canadian Collection from Royal Oak, B. C., appear to represent it.

### *Hyalomyodes robusta* TT.

- 1908, *Hyalomodes robusta* Townsend, Smith. Miss. Coll., Vol. LI, 125; male, White Mountains, New Mexico.

This species is more robust and more extensively covered with pollen than *triangulifera*. The head is nearly square in profile, with no projecting epistoma, with the front only slightly sloped and comparatively wide, the cheek groove and parafacials wide. The great change in head structure appears to be due only to the widening of the cheek groove, this change showing to some degree in *californica* but carried to great lengths in *robusta*, so that the epistoma has been placed in the clypeal plane, the face narrowed, and the antennae displaced upwards and outwards. It is like *triangulifera* in chaetotaxy,



wing venation, and genitalia, and for this reason should be left in *Hyalomyodes*. It ranges in Canada in British Columbia, New Brunswick, Nova Scotia, and in the United States in Idaho, New Hampshire, New Mexico, and Washington.

### ***Clistomorpha* TT.**

1892, Townsend, Can. Ent., XXIV, 79. Genotype, *C. hyalomoides* TT. (equals *Xysta didyma* Lw.).

This genus is very similar to *Hyalomyodes*, but the species are larger, and the apical cell is closed in the margin or very short petiolate. One species occurs in United States and Canada.

### ***Clistomorpha didyma* (Lw.)**

1863, *Xysta didyma* Loew, Cent. Dipt., IV, 86; male, Illinois.

1892, *Clistomorpha hyalomoides* Townsend, Can. Ent., XXIV, 79; male, New York.

1898, *Clytiomyia didyma* Lw. of Coquillett, Can. Ent., XXX, 233; (equals *hyalomoides* TT.).

1905, *Clytiomyia didyma* Lw. of Aldrich, Aldrich Cat., p. 440.

1927, *Clistomorpha didyma* Lw. of Curran, Can. Ent., LIX, 297.

The color of this species varies from grey pollinose to quite golden. Both Loew and Townsend stated that the pollinosity is silvery, but of the specimens I have seen, this applies well only to the western ones. One specimen in the U. S. National Museum from Tennessee Pass, Colorado, is wholly silvery, and this specimen further differs in having the apical crossvein ( $M_1$ ) nearly straight. It was taken at 10,240 feet and may represent a different species. The range of this species is as follows: Alberta (Slave Lake, Aug. 1 and Aug. 14; Tofield, Aug. 25; Cooking Lake, Aug. 16); Colorado (Tennessee Pass, 10,240 ft. July 12); Maryland (Grove Hill, Oct. 2 to 30 and Nov. 2); Virginia (Great Falls, Oct. 23; Mt. Vernon, Oct. 30); New York (Oswego, Oct. 1 and Sept. 6).

The Alberta and Colorado specimens are quite silvery, those from the eastern states golden. This condition coupled with the distribution of dates may indicate two generations, the first more silvery in color than the second.

### ***Neopsalidopteryx* n. gen.**

Genotype: *Clistomorpha alberta* Curran (1927, Can. Ent., LIX, 298).

The type runs to *Psalidopteryx* in available keys but differs from that genus in the following characters: head length equal to seven-tenths of head height; frontal profile arcuate to flat, bulging at the antennae in the male; oral margin axis straight and as long, or longer, than the antennal axis; eye reaching below the vibrissae; vertex one-eleventh head width in the male, one-third in the female; parafacials equal to one-fourth clypeal width; epistoma strongly warped forward, nearly as long as clypeus; clypeus slightly depressed; cheeks one-fourth eye height; haustellum one-half as long as head height, wholly slender; palpi not more than one-third as long as the haustellum, slender, cylindrical, only slightly enlarged at the apex; arista thickened on basal one-fourth, second segment three times as long as the first, one-eighth as long as the third.  $M_3$  midway between  $R_6$  and cubitus; cubitus subangular, one-fourth wing width from the hind margin; two costal spines nearly as long as  $R_6$ . Three pre-acrostichals with only one strong; three post-dorsocentrals; IPAL fine; four lateral scutellars, no apical scutellars.

Curran (1927 and 1934) united *Clistomorpha* TT. and *Hyalomyodes* TT., using the two species *C. alberta* Cn. and *C. deceptor* Cn. with subangular cubitus as the links. The two species have four lateral scutellar bristles, not three as stated in the original description, and omitted from the description is mention of frontal bristles extending below the antennal base, prosternal bristles, the longer and more dense bristling of the thorax and abdomen, and the very different genital segments. The females have a broad vertex, with orbital bristles, a character foreign to *Clistomorpha*. The two species have dark halteres, the second antennal segment reddish, and are separated by Curran (1927) as follows:

- Epistoma strongly warped, more prominent than the antennal protuberance  
*alberta* (Cn.)
- Epistoma only gently warped, not as prominent as the antennal protuberance  
*deceptor* (Cn.)

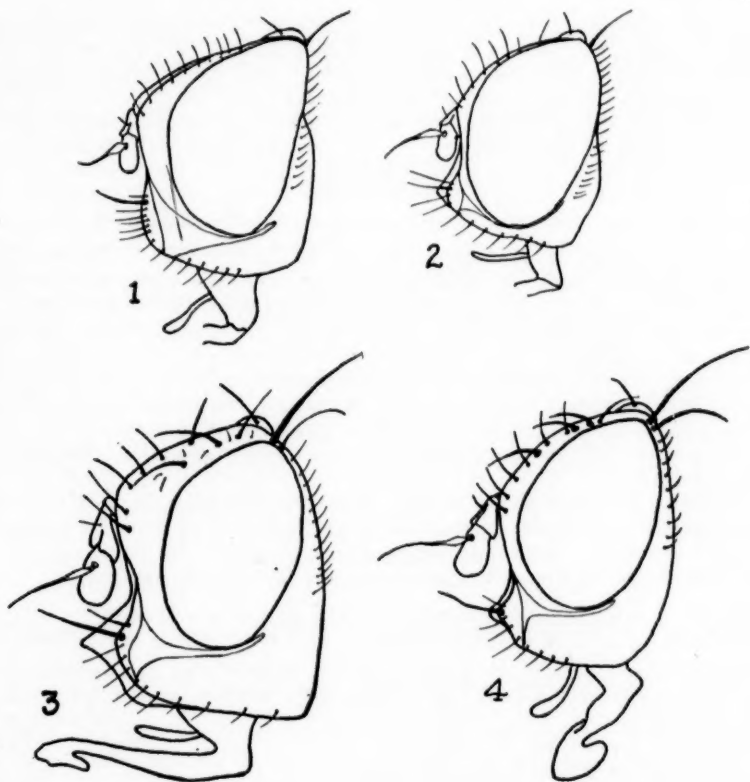


Fig. 1. *Hyalomyodes robusta* TT., female head.  
 Fig. 2. *Hyalomyodes triangulifera* Lw., female head.  
 Fig. 3. *Neopsalidopteryx alberta* Cn., female head.  
 Fig. 4. *Psalidopteryx macdunnoughi* n. sp., female head.

### ***Neopsalidopteryx alberta* (Cn.)**

1927, *Clistomorpha alberta* Curran, Can. Ent., LIX, 298; male from Alberta, head figured.

The type in the Canadian Collection is a male and as stated above, has four lateral scutellar bristles. The female has the front and face grey-yellow pollinose; second antennal segment red, third segment black, palpi brown; vertex width one-third head width, front bearing two proclinate and one reclinate orbital; epistoma strongly produced. Mesonotum and scutellum grey-yellow pollinose, no vittae or only faint brown spots; pleura grey pollinose. Legs black. Wings clear, veins brown; squamae white; halteres grey. Abdomen wholly grey-yellow, an obsolete median vitta darker; venter subshining grey.

One female from Grand Prairie, Alta., July 22, 1940 (C. L. Neilson), is in the Canadian Collection.

### **Neopsalidopteryx deceptor (Cn.)**

1927, *Glistomorpha deceptor* Curran, Can. Ent., LIX, 298; male from British Columbia; head and wing figured.

The type male, in the Canadian Collection, has four lateral scutellars as in *alberta*. The female is similar to *alberta* but with the epistoma only slightly produced; abdomen more yellowish, with hind margin of segments darker, and obscure vitta and first segment dark grey.

In the Canadian Collection there is one female from Pavilion Lake, B. C., June 7, 1938 (J. K. Jacob).

### **Psalidopteryx TT.**

1916, Townsend, Insec. Insc. Mens., IV, 21; genotype, *Psalidopteryx slossonae* TT.

The species of *Psalidopteryx* may be characterized as follows; small; abdomen globose; black, silvery or golden in color; male vertex narrow, female vertex wide and bearing orbital bristles; epistoma short and slightly projecting; proboscis short, haustellum thick; palpi slender to robust clavate and nearly as long as haustellum, never less than three-fourths of same; wings clear to dark, apical cell long petiolate, cubitus rounded right angle; no costal spine; thoracic and abdominal chaetotaxy well developed, four lateral scutellar bristles, two sternopleurals; median marginals lacking or vestigial on abdominal segment one, discs present on intermediate segments; male genitalia resembling the pincer of a crab.

This genus appears to be rich in species but poor in numbers. The male genitalia are difficult to work with, and for lack of material I have not been able to make a comparative study of the species on this point.

The following key will separate the North American species.

1. Males (males of *alaskensis*, *orientalis*, and *grandis* not known) ..... 2  
     Females (females of *nuda*, *pseudonuda*, and *fuscisquamis* not known) ..... 9
2. Species with abdomen wholly shiny black, at most with faint golden-brown pollen on the anterior edge of segments; wings tinged with brown (B. C.) ..... 5. *nuda* n. sp.  
     Species grey pollinose on abdomen ..... 3  
     Species yellow pollinose on abdomen ..... 6
3. Palpi yellow to brown; second abdominal segment entirely grey pollinose except a dorsal median spot and bases of setae which are black (Idaho, B. C.) ..... 9. *dorsalis* (Cq.)  
     Palpi dark brown to black; second abdominal segment largely black ..... 4
4. Parafacials deep golden-brown; palpi dark brown, hardly enlarged; wings nearly hyaline, faintly dark anteriorly; squamae very dark; second abdominal segment shiny, very narrowly pollinose antero-laterally ..... 1. *slossonae* TT.  
     Parafacials grey pollinose ..... 5
5. Second abdominal segment mostly shiny black, faint pollinose anteriorly, third and fourth faint pollinose; wings clear; palpi black, somewhat enlarged apically; prescutum thin brown pollinose (B. C.) ..... 4. *pseudonuda* n. sp.  
     Second abdominal segment with anterior edge (interrupted in the center) pollinose, third and fourth segments heavy pollinose, with obscure vitta; palpi black, not enlarged; prescutum grey pollinose (P. E. I.) ..... 2. *macdunnoughi* n. sp.



6. Haustellum abnormally short; palpi brown and short; second antennal segment somewhat reddish; head compressed (front to back) so that antennal prominence is evenly round and not projecting; squamae dark; wings brown tinged; two faint golden vittae on anterior mesonotum (Alta.) ..... 11. *fuscisquamis* n. sp.  
 Haustellum and palpi normal; second antennal segment dark brown to black ..... 7
7. Mesonotum wholly subshining brown, no pollen; parafrons and parafacials deep golden-brown pollinose; palpi black (Alta., B. C.) 6. *brunnea* n. sp.  
 Mesonotum with grey or brown pollen ..... 8
8. Mesonotum with grey pollen over the entire surface; parafrons and parafacials grey pollinose (B. C.) ..... 7. *pollinosa* n. sp.  
 Mesonotum with deep golden-brown pollen; parafrons and parafacials grey-brown; palpi brown (Que.) ..... 12. *psilocorsiphaga* n. sp.
9. Species grey pollinose on abdomen ..... 13  
 Species yellow pollinose on abdomen ..... 10
10. Second antennal segment bright yellow; palpi yellow and broadly clavate; entire abdomen golden-yellow pollinose (Colo.) ..... 10. *grandis* n. sp.  
 Second antennal segment dark brown to black; palpi black, brown, or yellow ..... 11
11. Palpi as long as haustellum, black, greatly enlarged at apex; abdomen mottled brown ..... 6. *brunnea* n. sp.  
 Palpi normal or not noticeably clavate ..... 12
12. Palpi thickened and flattened on entire length, shorter than haustellum and dark ..... 7. *pollinosa* n. sp.  
 Palpi cylindrical, normal, yellow to light brown ..... 12. *psilocorsiphaga* n. sp.
13. A number of long hairs on parafrontals along with the orbitals; thoracic microchaetae long and fine; abdomen mostly black, with narrow anterior margins of segments two and three, and more broadly four, pollinose (Alaska) ..... 8. *alaskensis* n. sp.  
 At most one or two short hairs outside orbitals; abdomen more extensively pollinose ..... 14
14. Abdomen wholly grey pollinose, with darker reflections; palpi brown to yellow ..... 9. *dorsalis* (Cq.)  
 Abdomen with segment one and posterior half of two shining black, or pollinose laterally ..... 15
15. Palpi deep black; abdomen deep black with silvery pollen; three proclinate orbitals; thorax with two brown vittae ..... 2. *macdunnoughi* n. sp.  
 Palpi brown to yellow; no brown vittae ..... 16
16. Abdomen mostly shining brown, the grey pollinosity shining, thin and as follows; a narrow interrupted band on anterior part of segment two, anterior four-fifths of segment three and four; bases of setae broadly brown (Va.) ..... 3. *orientalis* n. sp.  
 Abdomen darker; pollen thick and more extensive ..... 1. *slossonae* TT.

### 1. *Psalidopteryx slossonae* TT.

1916, *Psalidopteryx slossonae* Townsend, Insec. Insc. Mens., IV, 21; female, New Hampshire.

*Female.* The following comments are from Mr. Hall's letters: "... having the palpus neither yellow nor black, but a darkened brown or sort of intermediate shade" and "the type of *slossonae* TT. fits your description (of *macdunnoughi*) rather well but it differs from the description in the following particulars. The dorsum of the thorax does not show any vittae; most of the squamal lobe is tinged with yellowish; the basal abdominal segment (mor-

phological segments one plus two) is not totally shining black but has grey pollen laterally; the second abdominal segment has greyish pollen on the anterior half or slightly less and it has a shining black mid-dorsal stripe on each side of which are fair-sized areas of greyish pollen extending posteriorly to the marginal row of bristles."

*Male.* Length 3.5 mm. Palpi and antennae deep brown, third antennal segment black; palpi somewhat widened, equibroad or slightly enlarged, three-fourths as long as haustellum; eyes contiguous before ocelli; parafrons and parafacials deep velvety brown; clypeus brown; cheek and occiput thin golden pollinose. Mesonotum, pleura and scutellum subshining brown, faint brown pollinose. Legs dark brown. Abdomen mostly shining brown-black; first segment shining, second with only a very narrow grey pollinose antero-lateral edge, third and fourth with anterior half, except median vitta and bases of setae, grey pollinose.

Described from two males labelled Base Mt. Wash., N. H., Sept. 1 and Aug. 27, 1914 (C. Townsend), one specimen in the U. S. National Museum, one in the Canadian National Collection.

## 2. *Psalidopteryx macedunnoughi* n. sp.

*Male.* Length 4 mm. Antennae and palpi wholly jet black; palpi cylindrical, hardly thickened; parafacials, parafrons and clypeus grey, occiput thinly grey pollinose. Mesonotum, scutellum and pleura subshining black, the pleura wholly, and the mesonotum before the suture, with thin grey pollen; two dark vittae on anterior prescutum. Wings clear, squamae translucently darkened; halteres yellow. Legs black. Abdomen mostly shining black; first segment wholly shining, second segment with anterior margin grey, broadly interrupted in center, third and fourth wholly grey except shining setae bases and obscure median vitta.

*Female.* Pleura, mesonotum and scutellum deep grey pollinose. Mesonotum with two broad brown vittae extending from a little in front of suture to scutellum. Squamae white, faintly tinged with brown apically. Otherwise as in the male.

*Holotype.* ♂, Alberton, P. E. I., emerged March, 1940 (J. McDunnough); No. 5307 in the Canadian National Collection, Ottawa.

*Allotype.* ♀, same data.

*Paratypes.* 4 ♂, 5 ♀, same data as type; 2 ♂, 3 ♀, Brackley Beach, P. E. I., emerged February, 1942 (J. McDunnough). Two pairs of paratypes have been placed in the U. S. National Museum, Washington.

*Host.* The type series was reared by Dr. J. McDunnough from *Scythris* sp., taken on fireweed (*Epilobium*).

*Remarks.* This species, *slossonae*, and the next two appear to be closely related; the face is comparatively narrow in the male; the female palpi are slender, only slightly enlarged, and the microsetae of the thorax and abdomen are slender and of medium length but not as strong as the macrosetae.

## 3. *Psalidopteryx orientalis* n. sp.

*Female.* Length 3 mm. Second antennal segment and palpi brown; third segment and arista black; palpi flat and strongly widened at apex, three-fourths haustellum length; face, front and occiput grey pollinose. Mesonotum, pleura and scutellum wholly grey pollinose, no vittae. Wings hyaline, somewhat yellowish at the base, veins yellow; squamae white, halteres yellow. Abdomen mostly shining brown; first segment wholly shining, second with anterior half to third grey pollinose, interrupted in the center; anterior four-fifths of third and whole of fourth pollinose; obscure median vitta and bases of setae

shining brown. The pollen of the abdomen is of a silvery color, shining and not dense.

*Holotype*. ♀, Dead Run, Fairfax Co., Va., 28.X.15. (R. C. Shannon); in the U. S. National Museum, Washington.

*Paratypes*. 2 ♀, Dead Run, Fairfax Co., Va., 11.XI.15. (R. C. Shannon). One paratype has been placed in the Canadian National Collection, Ottawa.

#### 4. *Psalidopteryx pseudonuda* n. sp.

*Male*. Length 3.5 mm. Antennae, arista and palpi jet black; palpi cylindrical, hardly enlarged apically; parafrons, parafacials and clypeus grey, cheek and occiput grey pollinose. Pleura, mesonotum and scutellum subshining black, faint brown pollinose anteriorly. Wings clear, veins brown; squamae translucently dark; halteres yellow. Legs dark. Abdomen mostly shining black, second segment with very faint anterior edge pollinose; segments three and four very thin grey pollinose. Obscure vitta and bases of setae black.

*Holotype*. ♂, Clinton, B. C., emerged March 1, 1941 (Forest Insect Survey); No. 5309 in the Canadian National Collection, Ottawa.

*Host*. The above specimen was reared from *Peronea variana* Fern.

#### 5. *Psalidopteryx nuda* n. sp.

*Male*. Length 4 mm. Species wholly shining black; parafrons and parafacials very deep brown-black; palpi hardly thickened. Wings darkened, especially anteriorly and basally, veins dark brown; squamae black. Abdomen wholly black, at most faint brownish pollinose anteriorly on segments.

*Holotype*. ♂, Vancouver, B. C., IV.18.1936 (W. G. Mathers); No. 5310 in the Canadian National Collection, Ottawa.

*Paratypes*. 1 ♂, Vancouver, B. C., IV.12.1936 (W. G. Mathers); in the U. S. National Museum, Washington.

*Host*. The two above specimens bear the label, "Parasite of *Griselda radicana*?"

*Remarks*. This species and the next two appear to be related on larger size, microsetae long and fine, macrosetae strong and distinct; palpi long and slender in the male, inflated or clavate in the female; male face wide, inflated at the antennae.

#### 6. *Psalidopteryx brunnea* n. sp.

*Male*. Length 5 mm. Antennae and palpi black; palpi long and enlarged apically; parafrons and parafacials brown, greyed below; cheek grey. Mesonotum, scutellum and pleura subshining brown; two obscure golden vittae on prescutum; humeri and sternopleura thin brown pollinose. Wings clear, veins brown. Squamae dark brown; halteres yellow. Legs brown. Abdomen mostly dark shining brown, first segment without pollen, second with anterior lateral margins and submedian spots yellow, third segment with anterior margin and submedian lines yellow, fourth wholly yellow except the obscure vitta; bases of setae shining.

*Female*. Palpi long and clavate; head, pleura, mesonotum and scutellum grey-yellow, pollinose, vertex distinctly yellowish; squamae white. Abdomen wholly yellow pollinose with bases of setae brown. These setal spots are large and run together, especially along the median line and lateral margins of the segments, giving the abdomen a mottled appearance.

*Holotype*. ♂, Lethbridge, Alta., June 6, 1923 (H. L. Seamans); No. 5311 in the Canadian National Collection, Ottawa.

*Allotype*. ♀, Medicine Hat, Alta., Oct., 1911 (J. R. Mallock).

*Paratypes.* 1 ♂, Lethbridge, Alta., July 10, 1932 (H. L. Seamans); 1 ♂, Pincher, Alta., June 29, 1923 (Walter Carter); 1 ♂, Banff, Alta., July 4, 1925 (O. Bryant); 1 ♂, Cranbrook, B. C., 31.VII.18 (C. Garrett). The last two named paratypes are in the U. S. National Museum, Washington.

#### 7. *Psalidopteryx pollinosa* n. sp.

*Male.* Length 5 mm. Antennae and palpi very dark brown; third antennal segment black; palpi slender; parafrons and parafacials silvery grey; clypeus, cheek and occiput grey. Mesonotum and pleura light grey pollinose; scutellum and prescutellum subshining. Wings clear, veins brown; squamae light translucently yellowish. Legs dark. Abdomen mostly shining black; first segment wholly shining, second with grey-yellow pollen on anterior third, interrupted in the center, third and fourth mostly grey-yellow pollinose; obscure vitta and bases of setae shining.

*Female.* Palpi short and flattened, dark brown-black. Pleura, mesonotum and scutellum heavily grey-yellow pollinose, no vittae or only small brown spots; pollen of vertex yellow. Squamae white. Abdomen mostly yellow pollinose, segment two thinly so; bases of setae and posterior margin of segment two shining black.

*Holotype.* ♂, Chilcotin, B. C., 12.V.1920 (E. R. Buckell); No. 5312 in the Canadian National Collection, Ottawa.

*Allotype.* ♀, Trinity Valley, B. C., Aug. 3, 1937 (K. Graham).

*Paratypes.* 1 ♀, Vernon, B. C., July 1, 1923 (R. C. Treherne), in the Canadian Collection; 1 ♀, Crows Nest, B. C., 26.VII.1926 (A. A. Dennys), 1 ♂, Newgate, B. C., 17.VI.1927 (A. A. Dennys), in the U. S. National Museum, Washington.

*Host.* The Vernon paratype bears the label, "Parasite of *Anarsia lineatella*."

#### 8. *Psalidopteryx alaskensis* n. sp.

*Female.* Length 4 mm. Antennae black; palpi cylindrical brown; parafrons with a number of hairs besides the orbital bristles, subshining grey; parafacial, cheeks and clypeus grey pollinose. Mesonotum subshining grey brown pollinose, pollen thin; two obscure darker vittae on anterior part. Pleura grey pollinose. Wings clear, veins dark brown; squamae white; halteres yellow. Abdomen mostly shining black, the anterior fourth of segments two, three and four grey pollinose, broadly interrupted along the centre line. The posterior part of the segments with at most very thin grey pollen.

This species has the microsetae of the thorax and abdomen long, the pre- and post-acrostichals hardly distinguishable; four short, thin post-dorso-centrals and five lateral scutellars, the first and hind strong, the others weaker.

*Holotype.* ♀, Valdez, Alaska, VI.8.1921 (J. M. Aldrich); in the U. S. National Museum, Washington.

*Paratypes.* 1 ♀, same data as type.

#### 9. *Psalidopteryx dorsalis* (Cq.)

1903, *Hyalomyodes dorsalis* Coquillett, Proc. U. S. Nat. Mus. XXV, 108; male and female, Moscow, Idaho.

1905, *Hyalomyodes dorsalis* Cq. of Aldrich, Aldrich Cat., 437.

1927, *Clistomorpha dorsalis* Cq. of Curran, Can. Ent., LIX, 298.

Length 5 mm. Readily distinguished by the brown-yellow palpi and the extent of the pollen on the abdomen. One male in the Canadian Collection, from Oliver, B. C., shows this pollen very heavy and chalk-like. The female has the abdomen entirely grey pollinose with bases of setae brownish. The palpi of a female from Moscow, Idaho, are yellow and very broad, nearly as

wide as the haustellum, while a second female from Waterton, Alta., which seems to belong here has the palpi dark brown and only moderately enlarged.

This species and *grandis* are allied; the large size, appressed microsetae, the large, clavate palpi of the female, and short setae of the abdomen with only one strong median marginal and discal on segment two, one strong discal on three, and wholly pollinose abdomen of the female place them together.

#### 10. *Psilidopteryx grandis* n. sp.

*Female.* Length 5 mm. Second antennal segment yellow; palpi yellow, very broad and clavate; frontal vitta red; parafront and parafacial, clypeus, cheek and occiput heavy grey pollinose, somewhat yellowed on the vertex; pleura, mesonotum and scutellum grey-yellow pollinose, no vittae. Wings clear, veins light; squamae white with yellow edge; halteres yellow. Legs dark grey pollinose. Abdomen wholly golden-yellow pollinose; bases of setae darker; setae not dense, only one distinct erect marginal on segment two and one discal on segments two and three instead of the usual discal and marginal rows as in most other species.

*Holotype.* ♀, Old Faithful, Yellowstone Park, VIII.12.27 J. M. Aldrich), in the U. S. National Museum, Washington.

*Paratypes.* 2 ♀, Tennessee Pass, Colo., 10,240 feet, July 25, 1917, and VII.11 (J. M. Aldrich), in Washington; 1 ♀, Mt. Campbell, Colo., 1931, in the Canadian Collection, Ottawa.

#### 11. *Psilidopteryx fuselsquamis* n. sp.

*Male.* Length 4 mm. Second antennal segment reddish, third black; palpi brown, short and hardly thickened apically; haustellum very short; parafacials and parafrontals grey-brown; cheeks grey with a greenish tinge. Mesonotum subshining brown, with two obscure golden pollinose vittae before the suture, and darker brown prescutellar spot brown pollinose; pleura faint brown pollinose. Wings faintly brown; squamae dark; halteres yellow. Legs brown. Abdomen mostly shining dark brown, a narrow interrupted golden pollinose line on anterior margin of second segment, third segment with median spot and posterior lateral triangles shiny, fourth segment wholly pollinose; bases of setae shining.

The short haustellum and palpi, antennal prominence evenly rounded and the somewhat compressed head place this species apart from the others.

*Holotype.* ♂, Waterton, Alta., July 11, 1923 (H. L. Seamans); No. 5314 in the Canadian National Collection, Ottawa.

#### 12. *Psilidopteryx psilocorsiphaga* n. sp.

*Male.* Length 4 mm. Antennae black; palpi brown to yellow, slightly enlarged and flattened; eyes narrowly separated by frontal vitta; parafrons and parafacials grey becoming brown below; cheek grey pollinose. Mesonotum and scutellum subshining brown, the pollen brown and thin; pleura grey-brown pollinose. Wings clear, veins brown; squamae brown-gold; halteres yellow. Legs dark. Abdomen mostly golden pollinose, first segment thinly so; segments one and two with median shiny vitta, bases of setae shining; pollen heavy.

*Female.* Pleura and mesonotum thickly grey pollinose, no vittae; squamae white, wings clear, veins yellow. Abdomen wholly yellow pollinose, the bases of the setae darker. Otherwise as in the male.

*Holotype.* ♂, Berthierville, Que., 20.6.1932 (L. Daviault); No. 5315 in the Canadian National Collection, Ottawa.

*Allotype.* ♀, Berthierville, Que., 15.6.1932 (L. Daviault).

*Paratypes.* 1 ♂, Berthierville, Que., 20.6.1932 (L. Daviault), 1 ♀, Berthierville, Que., 23.6.1932 (L. Daviault), 1 ♀, Bar Harbour, Maine, July



17, 1934, in the U. S. National Museum; 1 ♂, Berthierville, Que., 19.6.1932 (L. Daviault), 4 ♀, Berthierville, Que., two dated 14.6.1932, one dated 23.6.1932, one dated 27.6.1932 (L. Daviault), in the Canadian National Collection.

*Host.* The Berthierville material was reared from *Psilocorsis* on birch by Dr. L. Daviault.

NEW DESCRIPTIONS OF LARVAE OF FOREST INSECTS, V,  
*EUPITHECIA*, *HYDRIOMENA* (LEPIDOPTERA, GEOMETRIDAE) \*

BY W. C. MCGUFFIN,

Ottawa, Ontario

The geometrid larvae feeding on spruce form a large and varied group. In collections taken from all parts of Canada where spruce is found, the Forest Insect Survey has identified 31 species (Brown, 1). To the best of the author's knowledge, there are descriptions for only 16 of these species. In this and the two following papers, seven more are described and two are redescribed. The general form of each description and the nomenclature of structures closely follows that of Brown and McGuffin (2). The illustrations have been executed by Miss M. R. MacKay, to whom the author wishes to express his sincere appreciation.

***Eupithecia palpata* Pack.**

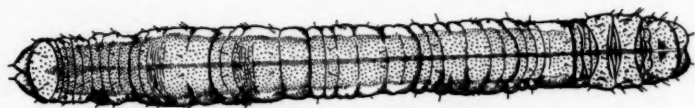
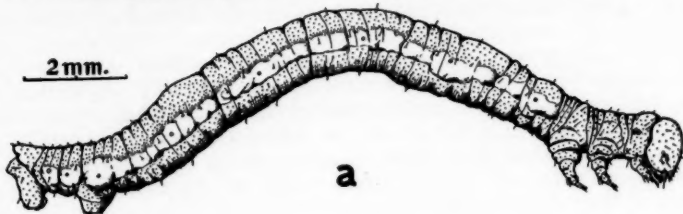
*Ultimate Instar:* Width of head 1.0 to 1.2 mm. Body 12 to 18 mm. in length and 1.0 to 1.2 mm. in width. Narrowest at first abdominal segment and broadest from fourth to ninth segments. Skin of the body is covered with isolated convex granules. Ground colour of dorsum varies from yellow through reddish to brownish orange and of venter from yellow to dark brown. Mid-dorsal line dark gray, the subdorsal gray with reddish suffusion, but not always present for the entire length of the body. Spiracular line yellow with orange suffusion on posterior segments; subspiracular line orange or gray. Midventral line white or yellowish white, varying in width. The head, covered densely with isolated convex granules, varies from yellow orange to reddish orange. Adfrontal suture white, sinuate. Epicranial index 0.8 to 1.0. Distance between ocelli 1 and 2 approximately equal to that between 2 and 3. Clypeus and labrum reddish orange; the latter shallowly notched at an angle of 120 degrees. Prothoracic shield concolourous with the dorsum, bearing a geminate middorsal line. Anal shield rounded on the posterior edge, orange with yellow at sides and at anterior lateral corners; the middorsal line crosses it entirely or in part. Setigerous tubercles are fine, small, brown papillae set directly on the skin; the setae short and inconspicuous. Spiracles small, circular, with narrow, brown or orange rims and yellow centres. Thoracic legs light orange, prolegs light orange or pink; abdominal proleg bears 8 crochets.

*Mouthparts:* Mandibles (Fig. a) light brown, with two ridges and six teeth; the last tooth is low, rounded and usually appears divided. Hypopharynx of the ordinary type (Fig. d) which is conical, with the lingua, maxillulae and gorge bare and undifferentiated. Spinneret conical, rounded at tip. Labial palpi with the segments in the proportion of 6, 3 and 6.

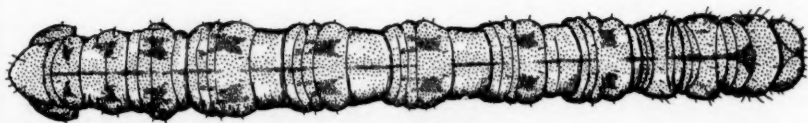
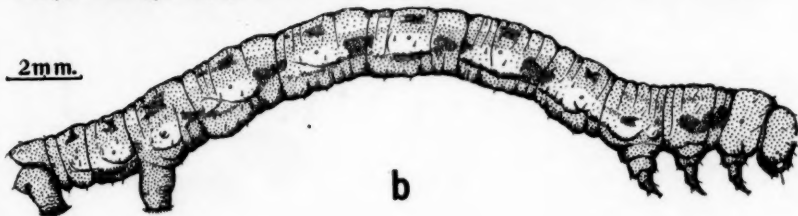
*Food Plants:* White, black and Engelmann spruce; balsam, tamarack;

\*Contribution No. 2168 from the Division of Entomology, Science Service, Department of Agriculture, Ottawa. This is the fifth of a series of contributions from the Canadian Forest Insect Survey.

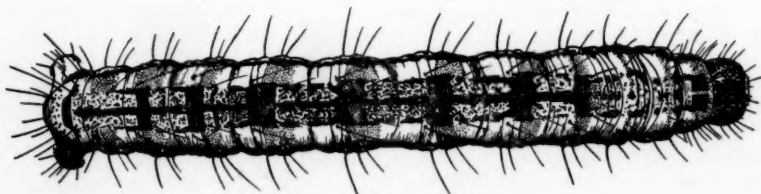
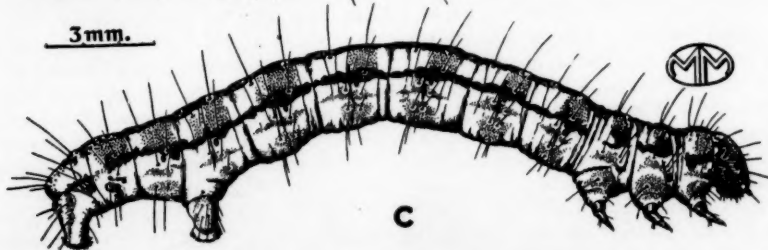
## PLATE XII.

2 mm.

a

2 mm.

b

3 mm.

c

LARVAE OF FOREST INSECTS: GEOMETRIDAE

white, jack and red pine. Pine-feeding larvae are usually lighter in colour than those feeding on the other conifers.

***Eupithecia gibsonata* Tayl.**

**Penultimate Instar:** Head width 1.0 to 1.1 mm. Body length 10 to 11 mm. Body width 1.5 mm. Ground colour of body green. Middorsal line green, grayed blue-green where dorsal blood vessel shows. Subdorsal line yellow, appearing only on posterior half of each abdominal segment. Spiracular line borne on a carinate ridge, dark gray, white at middle of segment. Midventral line yellow; intersegmental areas of body yellow. Head pea-green. Epicranial index 1.0. Distance between ocelli 1 and 2 equal to three times that between ocelli 2 and 3. Prothoracic shield green grading to yellow anteriorly; anal shield green with yellow edges. Setae short, light, inconspicuous. Spiracles small, circular with light brown rims and light centres. Thoracic legs green, hyaline at tips. Prolegs green; ventral proleg bears 10 crochets.

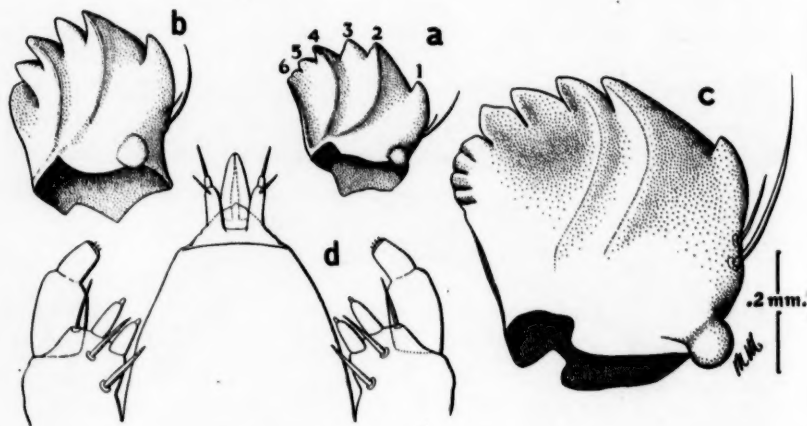


Fig. a. Mandible of *Eupithecia palpata* Pack.

Fig. b. Mandible of *Eupithecia gibsonata* Tayl.

Fig. c. Mandible of *Hydriomena divisaria* Wlk.

Fig. d. Hypopharynx and spinneret of *Pero morrisonarius* Hy. Edw.

**Ultimate Instar:** Head width 1.4 to 1.5 mm. Body length 17 to 19 mm. Body width 1.5 to 2.0 mm. Body densely covered with minute convex granules. Ground colour of body green. Middorsal line bluish-green. Subdorsal line yellow with large gray spot in middle of abdominal segments 1 to 8. Spiracular line borne on a carinate ridge, white at midsegments and gray at intersegments. Midventral line pale yellow or white. Body yellowish at intersegments. Head pea-green, smooth. Adfrontals ground colour with almost indiscernible, slightly wavy sutures. Epicranial index 1.3 to 1.5. Distance between ocelli 1 and 2 three times that between ocelli 2 and 3. Postclypeus light green, preclypeus whitish, labrum light brown, shallowly notched at an angle of 120 degrees. Prothoracic shield green, yellow anteriorly. Anal shield green, edged with yellow and triangular in shape. Setigerous tubercles consisting of small, golden-brown papillae set directly on the integument. Setae very short, light in colour and inconspicuous. Spiracles golden with light brown rims, circular in shape. Thoracic legs green, light brown distally. Prolegs green, the ventral proleg bearing 10 to 16 crochets.

**Mouthparts:** Mandibles (Fig. b) much like those of *E. palpata* but

have longer, more acute teeth. Hypopharynx as in *E. palpata*; the labial palpi with the segments in the proportion of 10, 4 and 9.

*Food Plant:* White cedar.

### *Hydriomena divisaria* Wlk.

*Antepenultimate Instar:* Head width 1.2 mm. Body about 10 mm. in length and 1.5 mm. in width. This stage is more ruddy than the following instars. Epicranial index is 1.0. Each ventral proleg bears 30 crochets.

*Penultimate Instar:* Head width 1.5 to 1.6 mm. Body length 10 to 13 mm. Body width 1.4 to 1.5 mm. Epicranial index 0.8 to 1.3. Distance between ocelli 1 and 2 slightly more than that between 2 and 3. Crochets on ventral prolegs number from 30 to 35.

*Ultimate Instar:* Head width 1.7 to 2.0 mm. Body 13 to 18 mm. in length and 2.0 to 3.0 mm. in width. Body widest on abdominal segments 1 to 6, tapering evenly anteriorly and posteriorly. Integument of body smooth. Ground colour dirty white with gray marbling; there may be a pink suffusion on anterior half of the abdominal segments. Middorsal line dark gray or dark gray-brown. Addorsal line of ground colour, lined laterally with a weak or broken dark gray line. These two lines are connected on every abdominal segment except the last by roughly rectangular transverse gray patches. Supraspiracular line dark gray or gray-brown. Spiracular line of ground colour with brown stippling, flanked ventrally by a broken ruddy brown line. There is a rosy suffusion above the base of each thoracic leg. Venter of ground colour with a pinkish blush in the subventral area. Head smooth, light brown with brown markings as follows: herring-bone patterns along the epicranial stem, a dark bar running from the supraspiracular line of the body to the ocellar area and dark spots in patches above this bar. Ocellar area brown. Adfrontals brown at upper ends and pale towards the clypeus. Adfrontals sutures light and wavy. Frons light at apex and below frontal setae but brown between these areas. Epicranial index 0.8 to 1.3. Distance between ocelli 1 and 2 slightly more than that between ocelli 2 and 3. Postclypeus light brown; preclypeus dirty white. Labrum deeply cleft at an angle of 60 to 90 degrees. Prothoracic shield is a rectangular brown patch divided on middorsal line by a fine, light line. Anal shield of ground colour with a gray rectangular patch at the end of the middorsal line; scattered brown pits, numbering about 25, on the posterior part of the shield. Spiracles fairly large, oblong-elliptical in shape, with heavy dark brown rims. Setigerous tubercles are composed of dark brown papillae set on small convex brown pinacula. Setae brown, long and conspicuous. Coxae of thoracic legs of ground colour; the remainder of leg with light brown sclerotizations. Prolegs of ground colour, often with ruddy suffusion. Anal proleg has a brown sclerotized plate on its posterior, outer area. Abdominal prolegs bear 30 to 40 crochets.

*Mouthparts:* Mandibles (Fig. c) brown, with two ridges and six teeth; the last tooth is broad, rounded and fluted. Hypopharynx of the ordinary type, the spinneret subcylindrical, rounded at tip. Labial palpi with the segments in the proportion of 25, 4 and 14.

*Food Plants:* White, black and red spruce; also balsam and tamarack.

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1. Brown, A. W. A. (1941) Foliage Insects of Spruce in Canada. Tech. Bull. 31, Dept. of Agriculture, Ottawa, Canada.
2. Brown, A. W. A. and McGuffin, W. C. (1942) New descriptions of larvae of forest insects. Introduction; I. Panthea. Can. Ent., Vol. 74, p. 8 et. seq.

#### EXPLANATION OF PLATE XII.

- a. Larva of *Eupithecia palpata* Pack. (ultimate instar).
- b. Larva of *Eupithecia gibsonata* Tayl. (ultimate instar).
- c. Larva of *Hydriomena divisaria* Wlk. (ultimate instar).

# A NEW RACE OF *PIERIS NAPI* (L.) FROM NEW MEXICO (LEPIDOPTERA, PIERIDAE)

BY W. N. BURDICK,

Los Angeles, California

Collecting in the mountains of central New Mexico during the early summer of 1940 produced a race of *Pieris* somewhat resembling *Pieris napi pseudonapi* B. & McD., but a comparative examination proves it to be different from that insect in quite a number of recognizable and distinct characteristics. A series of these New Mexico specimens was forwarded to Dr. McDunnough, who, after comparing it with paratypes from the Barnes Collection now in the United States National Museum, suggested a number of qualities that would separate it from *pseudonapi*. To assist this writer in the description to follow, paratypical material of *pseudonapi*, through the courtesy of Dr. McDunnough, is at this time at hand, so that an accurate comparison may be accomplished. Also a series of *pseudonapi* from Pitkin Co., Colorado, was compared with the New Mexico material. These Pitkin Co. specimens showed quite a little variation among individuals, but only one of them approached those from New Mexico. On the contrary little or no variation of consequence existed in a series of over sixty specimens from New Mexico. The mentioned series from Pitkin Co., while not topotypical, could not be placed as other than *pseudonapi*, individual variation being too meager for any separation from the topotypical material from Silverton, Colorado.

This New Mexico race inhabits the two high mountain ranges of central New Mexico, the Mogollon in the west central section and the Sierra Blanca in the central part of the State. This race, it seems, is rather restricted to these areas and adjacent territory, having chosen regions of slightly over 8,000 feet in elevation and may be found along the edges and in small open spaces in heavy stands of Englemann Spruce growing on the north side of the mountains. Inasmuch as the first large colony was discovered by the author in the Mogollon Range, it is suggested that this race become known as

## *Pieris napi mogollon* race nov.

**Male.** Expanse about 1.65 inches. Upper side: Primaries,—the black edge of the apical area and the black shading at the termini of the upper and lower radial veins is much more intense and well defined than in *pseudonapi*. There are similar, but much smaller, shaded spots at the termini of the two upper median veins, not perceptible in *pseudonapi*. The heavy black shading along the veins on the underside shows through quite plainly on the upperside, unlike *pseudonapi* which does not present a lined appearance on the upper surface. Secondaries,—the black shading on the underside shows through quite strikingly, and to about the same degree as it does in *P. napi venosa* Scud. Also like *venosa* and unlike *pseudonapi*, the termini of the nervules are tipped with black. In fact the entire upper surface closely resembles *venosa* except that there are no spots in the limbal area, also *venosa* is a more chalky white.

Under side: Primaries,—unlike *pseudonapi*, the shading along the veins is almost as heavy as in *venosa* but more blackish, not brown as in *venosa*. Secondaries,—the black lines along the veins are much more intense and more clearly defined than in *pseudonapi*, but a little less broad than in *venosa*. In *pseudonapi* these lines are weaker and more diffused, and it also presents a pale yellow color over the secondaries and in the apical area of the primaries; this feature is not typical of *mogollon*, but an occasional individual shows a slight tendency in this direction.

**Female.** It is much like the male, with the lines more accentuated on the upper side of the primaries and the black at the termini of the veins extending



along the veins well into the limbal area of both wings. Like *pseudonapi* the black dots of the primaries are practically obsolete. A few almost imperceptible black scales are often present on the costal margin of the secondaries, near the outer angle.

*Holotype*. ♂, Mogollon Range, Catron Co., New Mexico, 5-7-40. No. 5222 in the Canadian National Collection, Ottawa.

*Allotype*. ♀, same data.

*Paratypes*. 2 ♂, same data; 3 ♂, Sierra Blanca Range, Lincoln Co., N. M., 5-25-40; all in the Canadian National Collection, Ottawa. 1 ♂, Mogollon Range, Catron Co., N. M., 5-7-40 and 1 ♀, Sierra Blanca Range, Lincoln Co., N. M., 5-20-40; in the United States National Museum. Fifty-six paratypes from the above locations in the collection of the author, from which other museums will be supplied.

## NOTES ON THE CICADIDAE OF ALBERTA

BY E. R. TINKHAM,

Phoenix, Arizona

From time to time during the past, the writer has endeavored to collect cicadas in Alberta, his boyhood home, whenever the opportunity presented. Some of the specimens reported here were taken many years ago when the writer was still a boy; others were taken at a more recent date. The following note is written to bring up-to-date information concerning the cicada fauna of Alberta. The material is based on the writer's own collecting, augmented by reports from the work of the well known authority, Mr. Wm. T. Davis. At present four species are known from Alberta; one species reported here, *Okanagana synodica* (Say), apparently representing a new record to the Alberta list, and also to the Canadian list.

### *Okanagana canadensis* (Provancher)

1 ♂, Edmonton, Alberta, early June, 1925 (E. R. Tinkham; trilling in *Salix* sp.). Rolla, B. C. (J. C. Sproule); several males taken in 1926.

The male taken by the writer in early June of 1925 was captured in a willow tree growing in the valley of the North Saskatchewan River about three miles west of Edmonton. Several males taken at Rolla, B. C., just west of Grande Prairie in the Peace River Block, were given to the writer by Mr. J. Campbell Sproule. Davis (1930) reports two males collected in Edmonton, June 16, 1916, by the late coleopterist, Prof. F. S. Carr, and three males and one female also from Edmonton, June 5 to 14, 1925, by that veteran collector Mr. Owen Bryant. *Okanagana canadensis* is known to range across Canada from New Brunswick to Alberta and southward to New Hampshire, Pennsylvania, Michigan, South Dakota, and Colorado.

### *Okanagana bella* Davis

4 ♂, Near Blairmore in Crowsnest Pass, Canadian Rockies, about 4600 feet, July 1, 1927 (E. R. Tinkham; in pines).

Mr. Davis described this species in 1919 when he reported two males from Alberta taken at Jasper, July 4, 1915, and deposited in the Davis and Cornell Collections. The type locality in Stockton, Utah. The writer captured his specimens on a hot day in the mountains near Blairmore. The pines on which these males were taken were probably *Pinus contorta*, a common species in the

Canadian Rockies. *Okanagana bella* is known from Utah, Colorado, Kansas, New Mexico, Wyoming, Montana, Idaho, Washington, Oregon and California.

### *Okanagana synodica* (Say)

4 ♂, Lethbridge, Alberta, late May of 1926 and 1927 (E. R. Tinkham). I have not been able to find any mention of this species for Canada or Alberta in the publications of Mr. Davis and hence assume that this is not only the first Alberta record but also the first Canadian record for the species. The writer found this species singing in low bushes on the steep slopes of the hogbacks of the Old Man River at Lethbridge. It is a small, tan colored species. *Okanagana synodica* is a member of the Transitional faunal zone and is now known from southern Alberta, south through Montana, Colorado, and New Mexico, east to western Nebraska, Kansas, and Texas.

### *Okanagana luteobasalis* Davis

1927 *Okanagana fratercula* Davis. Jour. New York Ent. Soc., 35:379.

1935 *Okanagana luteobasalis* Davis. Jour. New York Ent. Soc., 43:303.

4 ♂, Higdon Ranch, Milk River Valley, 10 miles west of Comray near Wildhorse, Alberta, July 18, 1938 (E. R. Tinkham). Males also heard singing ten miles east of Warner, Alberta, July 16, 1938.

In 1935, Davis described this species with type locality as Hatch, Davis County, Utah. Among the paratypes were one male and one female from Medicine Hat, Alberta, June 29, 1923 (F. S. Carr) and five males from the Cypress Hills, Alberta (F. S. Carr.). A communication from Mr. Davis dated March 25, 1941, stated in effect that the series from the Cypress Hills referred to *Okanagana fratercula* Davis by Davis in 1927, actually represented the more recently described *O. luteobasalis*.

The specimens of *O. luteobasalis* taken at the Higdon Ranch in the southeastern corner of Alberta were captured trilling in small bushes on the hot slopes of the Milk River Valley. The species appears to be a member of the Upper Sonoran Faunal Zone and is known from southeastern Alberta; Marmath, North Dakota; Enid, Montana; Oregon; Idaho, and Utah.

One other species may yet be found in Alberta. It is *Okanagana rimosa* (Say) which is known from Aweme, Manitoba, and Mandan, North Dakota.

### REFERENCES

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Mailed Monday, September 28, 1942.

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